

Borehole

10-01-04**Log Event A****Borehole Information**

Farm : <u>A</u>	Tank : <u>A-101</u>	Site Number : <u>299-E25-92</u>
N-Coord : <u>41,179</u>	W-Coord : <u>47,772</u>	TOC Elevation : <u>689.57</u>
Water Level, ft : <u>124.40</u>	Date Drilled : <u>4/30/62</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>125</u>	

Cement Bottom, ft. : 18 Cement Top, ft. : 0

Borehole Notes:

Borehole 10-01-04 was originally drilled in April 1962 and completed at a depth of 75 ft with 6-in. casing. In 1978, the borehole was deepened to 125 ft. The driller's log indicates that the deepening was accomplished by installing a temporary 8-in. overshot casing to a depth of 18 ft and drilling the 6-in. casing to a depth of 130 ft. The 6-in. casing was then retracted to 125 ft and the bottom 5 ft of the borehole was filled with 9 gal of grout. On completion of the deepening, the temporary 8-in. casing was removed and 36 gal of cement grout was injected into the void space between the permanent 6-in. casing and the 8-in. portion of the borehole wall.

"As-built" drawings for the A Tank Farm indicate the original borehole was constructed with 6-in., schedule-30 pipe; however, this type of pipe was not identified in engineering references such as Driscoll (1986). The casing thickness for the borehole is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. casing.

The top of the casing is the zero reference for the log. The casing lip is approximately even with the ground surface.

Equipment Information

Logging System : <u>2</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1996</u>	Calibration Reference : <u>GJO-HAN-13</u>	Logging Procedure : <u>P-GJPO-1783</u>

Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>11/21/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>36.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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Log Run Number :	<u>2</u>	Log Run Date :	<u>11/21/1996</u>	Logging Engineer:	<u>Bob Spatz</u>
Start Depth, ft.:	<u>35.0</u>	Counting Time, sec.:	<u>100</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>48.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Log Run Number :	<u>3</u>	Log Run Date :	<u>11/22/1996</u>	Logging Engineer:	<u>Bob Spatz</u>
Start Depth, ft.:	<u>124.5</u>	Counting Time, sec.:	<u>100</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>47.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Logging Operation Notes:

This borehole was logged in three log runs. The total logging depth achieved by the SGLS was 124.5 ft.

Analysis Information

Analyst : S.D. BarryData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 02/10/1998**Analysis Notes :**

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing (based on a 6-in., schedule-40 pipe) were applied to the entire logged interval during the analysis process.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Plots of the shape factor analysis results are included. These plots are used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.

A time-sequence plot of the historical gross gamma log data from 1979 to 1987 is presented with the SGLS log plots.



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Results/Interpretations:

The man-made radionuclides Cs-137 and Co-60 were detected around this borehole. Cs-137 contamination was detected nearly continuously from the ground surface to 22.5 ft, continuously from 76 to 77.5 ft, and just above the MDL near the bottom of the logged interval. Co-60 contamination was encountered from 38 to 71 ft.

The K-40 log plot shows a sharp concentration increase at 15 ft and a slight increase at about 71 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factors provide insights into the distribution of the Cs-137 and Co-60 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides. The shape factor analysis for the interval from the ground surface to 16 ft is not valid because of the presence of grout on the outside of the borehole casing. The shape factor analysis indicates the Co-60 contamination is distributed in the backfill sediments.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank A-101.